

The two parts of the nervous system are:

- the **central nervous system** (CNS), made up of your brain and your spinal cord
- the **peripheral nervous system** (PNS), made up of the nerves that carry messages to and from the CNS and other parts of your body.

The CNS receives information from all over the body, processes that information, and then sends out messages telling the body how to respond.

Nerve cells

The nervous system is made up of trillions of nerve cells or **neurons**. Neurons carry electrical messages, called **nerve impulses**, from one part of your body to another at very high speed. These nerve impulses can travel in only one direction.

As you can see in Figure 7.1.2, a neurone has four main parts: a cell body, dendrites, knobs and an axon. The **cell body** contains the nucleus, which is the control centre of the cell. The **dendrites** branch out from the cell body and receive messages from other nerve cells, which are then sent on to the cell body. The **axon** or nerve fibre sends nerve impulses in only one direction—away from the cell body. The knobs pass the message on to the next neurone. Two common types of neurones are:

- **motor neurones**—these carry messages from the CNS to **effectors**. Effectors are muscles or glands (tissues that secrete chemicals) that put the messages into effect
- **sensory neurones**—these carry messages from cells in the sense organs (such as your eyes, ears, tongue and skin) to the brain and spinal cord.

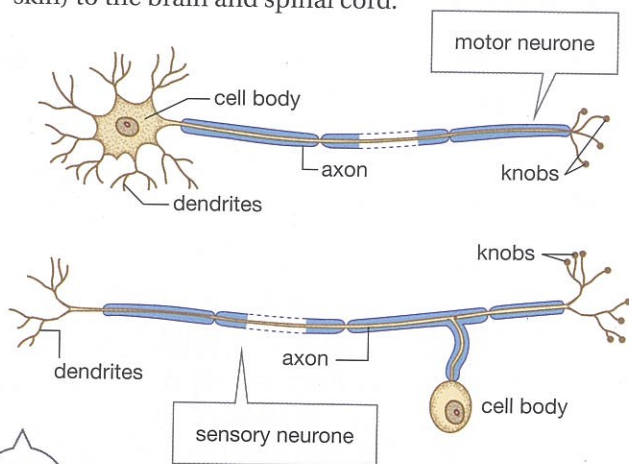


Figure 7.1.2

Two types of neurone

The messages sent along the neurone are electrical. If all the neurones in your body touched one another, stimulating one nerve ending would be like turning on one switch in your house and having all the lights and appliances come on. Your body needs to control which nerves 'fire' at a certain time.

When the nerve impulse reaches the knobs at the end of an axon, a chemical called a **neurotransmitter** is released into the space between the neurones (**synapse**). You can see this in Figure 7.1.3. The neurotransmitter carries the message from the axon of one neurone to the dendrite of the next neurone. The dendrite receives the chemical message and sends off an electrical signal.

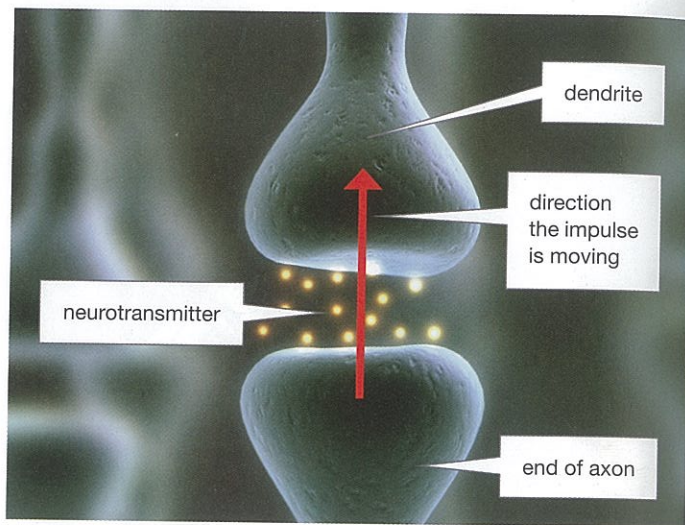


Figure 7.1.3

At the synapse, the electrical signal of the nerve is converted into a chemical signal and then back into an electrical signal again.

About 50 different neurotransmitters have been found that carry electrical impulses across these gaps. These neurotransmitters control which nerves fire and when.

In your body, the neurones are bundled together to form nerves, as shown in Figure 7.1.4. Neurones are covered with an insulating layer called a **myelin sheath**. The myelin sheath electrically insulates the neurones from each other and increases the speed of the nerve impulse.

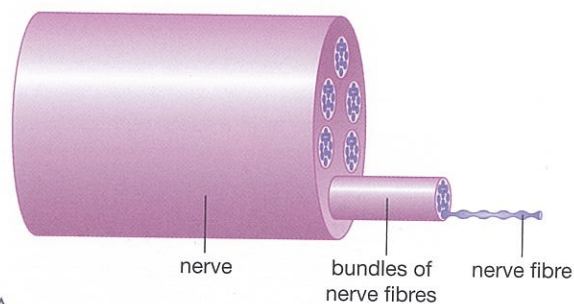


Figure 7.1.4

A nerve is made up of a large number of neurones, each of which is surrounded by a myelin sheath.

The parts of the CNS that contain neurones covered in myelin are called white matter. The parts that contain mainly cell bodies are called grey matter. The outer parts of the brain are made up mainly of grey matter.

